

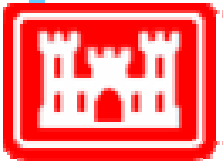
The Development of a Regional Routing Model

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Review of Regional Routing Model

Over 20 people participated by phone and person

Presentations and Minutes on Website

Set up final review meeting in April

Outcome-

- General reaction was positive, including working with other agencies
 - Examine ways to work with group on articles, etc.
 - Mixed expectations regarding ultimate outcomes
 - Recognized need to balance data with models in a consistent framework
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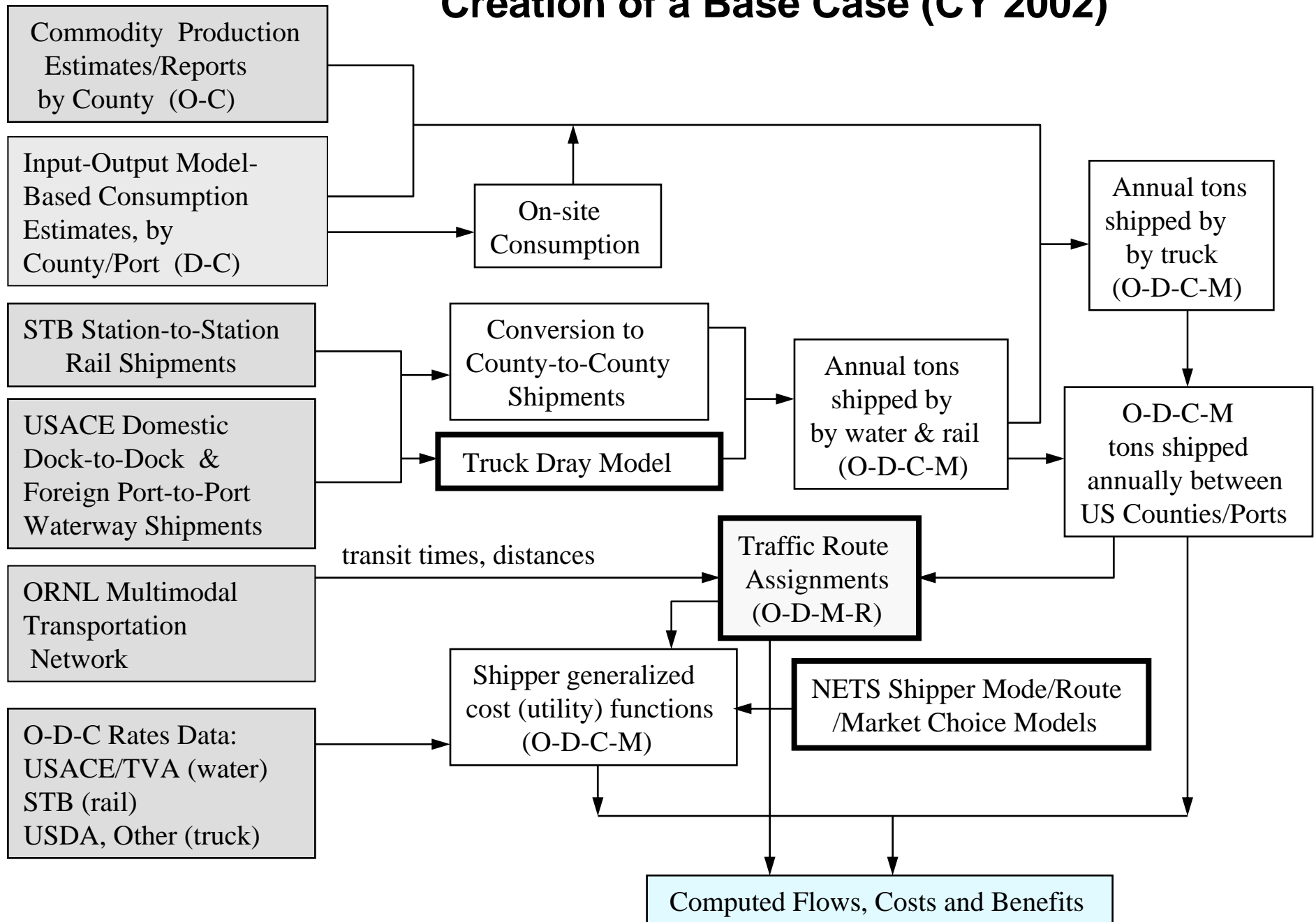
Regional Routing Model Objectives

- Construct Database of Origins, Destinations, Modes, Rates and Commodities for base year
 - Utilize infrastructure networks to assign the traffic and system capacity
 - Estimate the effects of changes in demand and network-based supply on these flows and their costs
 - Provide User Interface to RRM data and analysis
 - Understand relationships of other data/models
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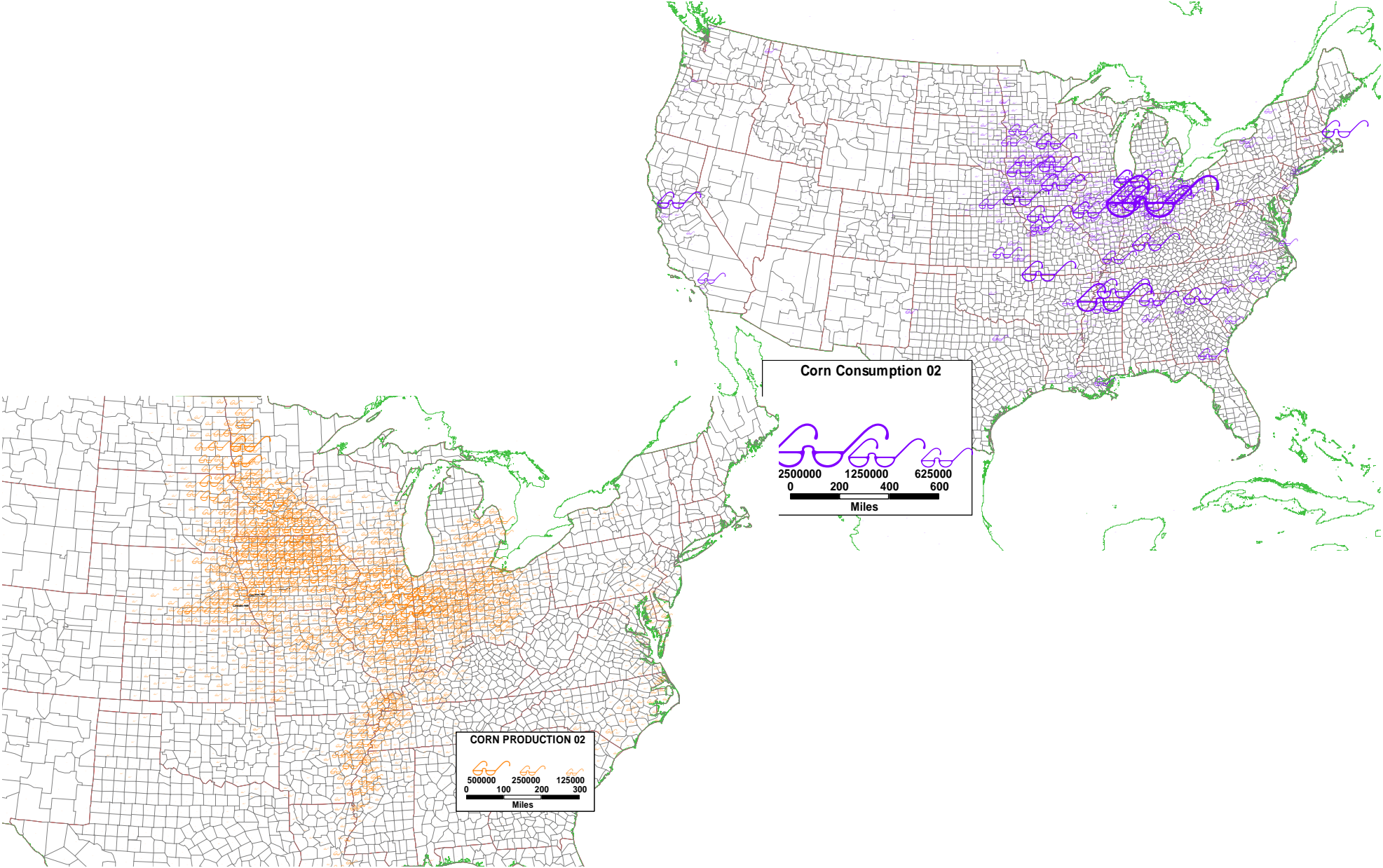
Prototype Database

- Five commodities picked
Corn, Wheat, Soybeans, Apples, Processed Poultry
 - Base Year – 2002 (1997, 2003 partials)
 - Geography – County to County flows
 - Mode – waterway, rail, truck
 - Domestic and International Shipments
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Creation of a Base Case (CY 2002)



Estimated U.S. Corn Production and Consumption by County, 2002



Key partners

- USDA
- TVA
- FHWA – existing MOU
- ORNL



USDA – MOU and Data

- Provided I/O Matrix of five commodities for 2002 for production and consumption (can do other commodities as needed)
 - Imports and exports are explicitly recognized in I/O Model
 - Have a completed unsuppressed Ag. Census
 - Will serve as final reviewer for prototype GIS development
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TVA Data and Rate information

Provided 1997, 2002 and 2003 dock-to-dock datasets for:

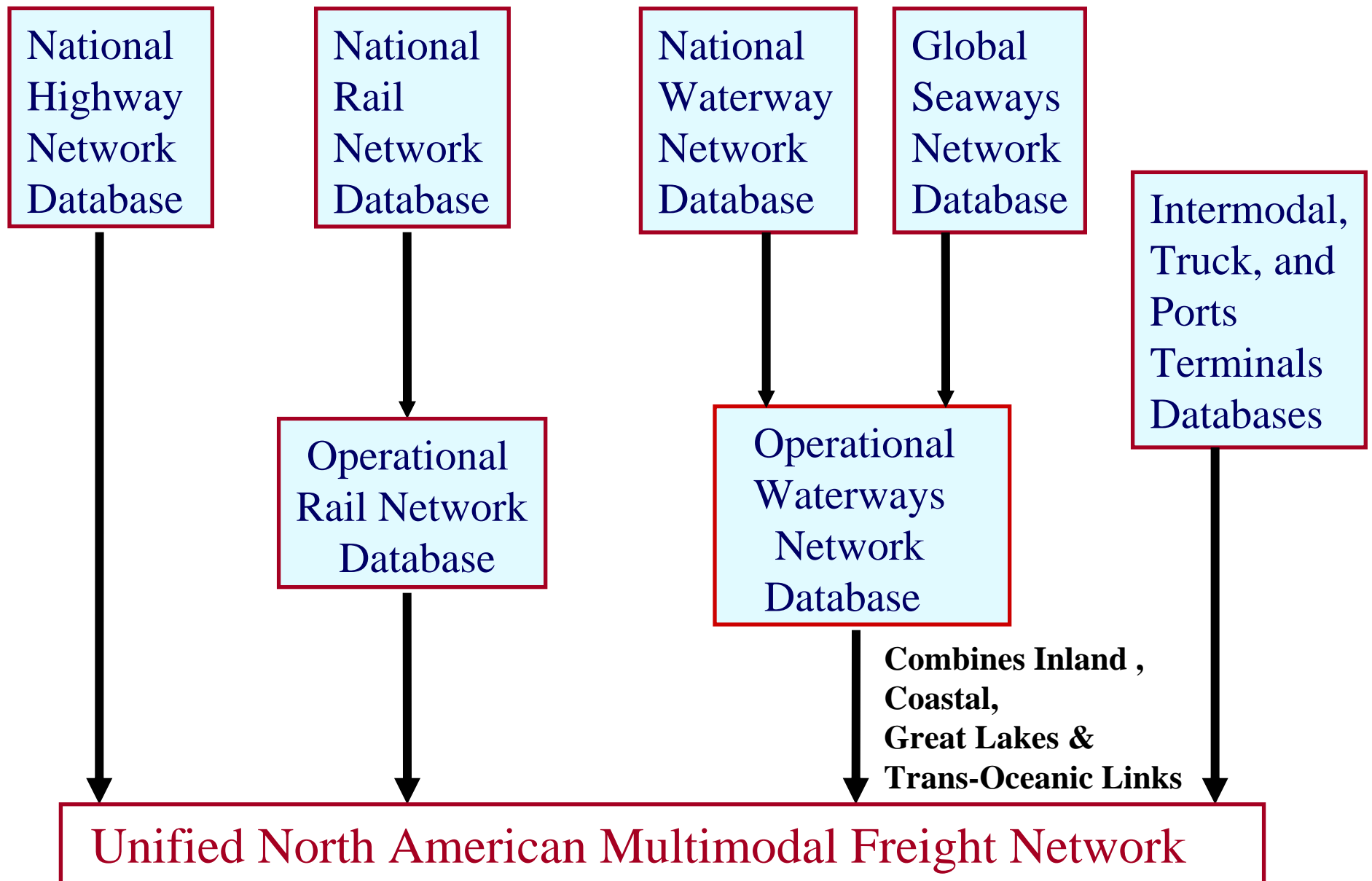
- U.S. Produced Grains (Corn, Wheat, Soybeans):

Annual and quarterly dock-to-dock movement tonnages and average shipment rates, for most regions

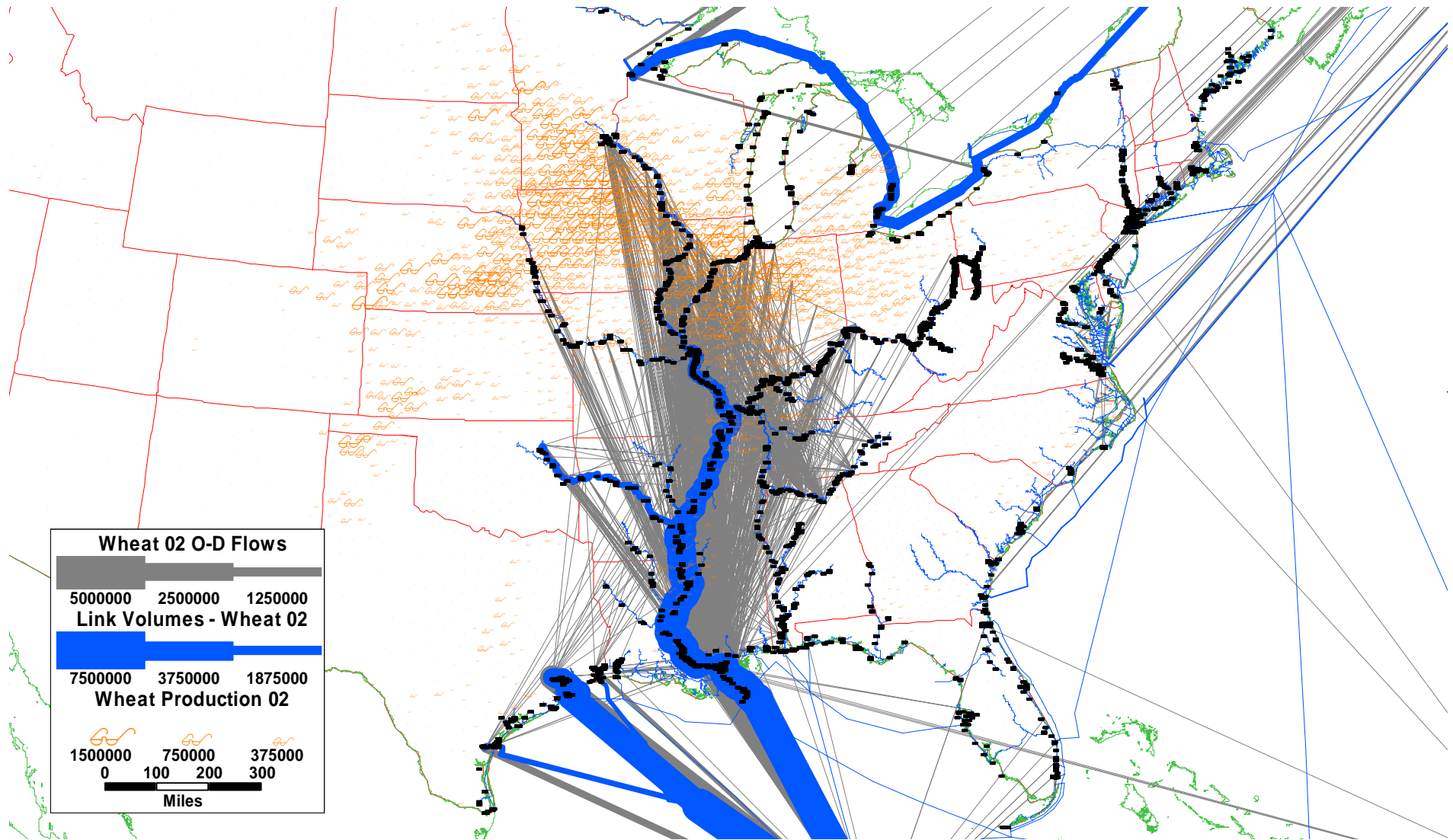
- All Commodities:

Annual and quarterly dock-to-dock movement tonnages, by commodity class, all locations

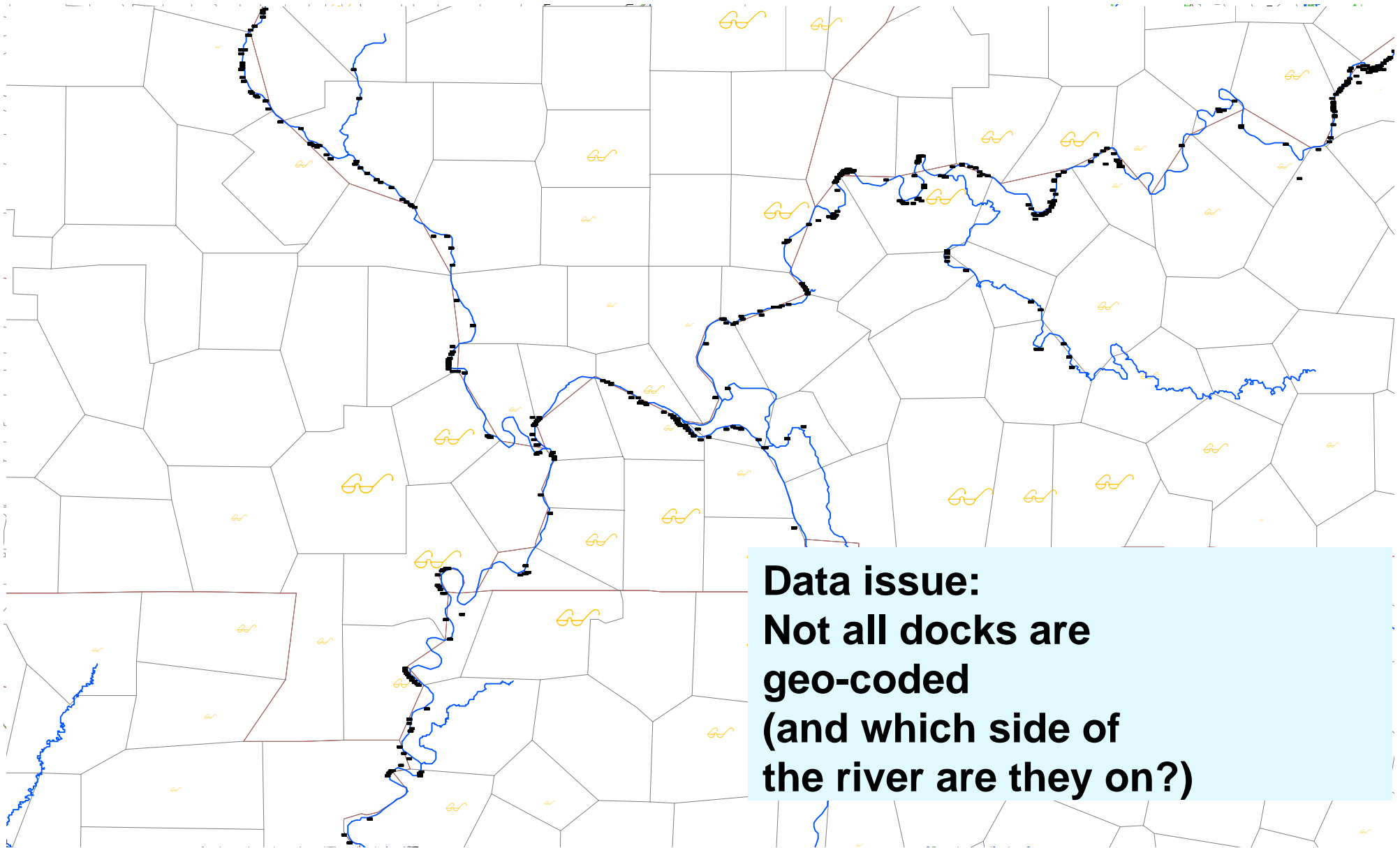
* Rates for Columbia-Snake-Willamette Rivers currently missing



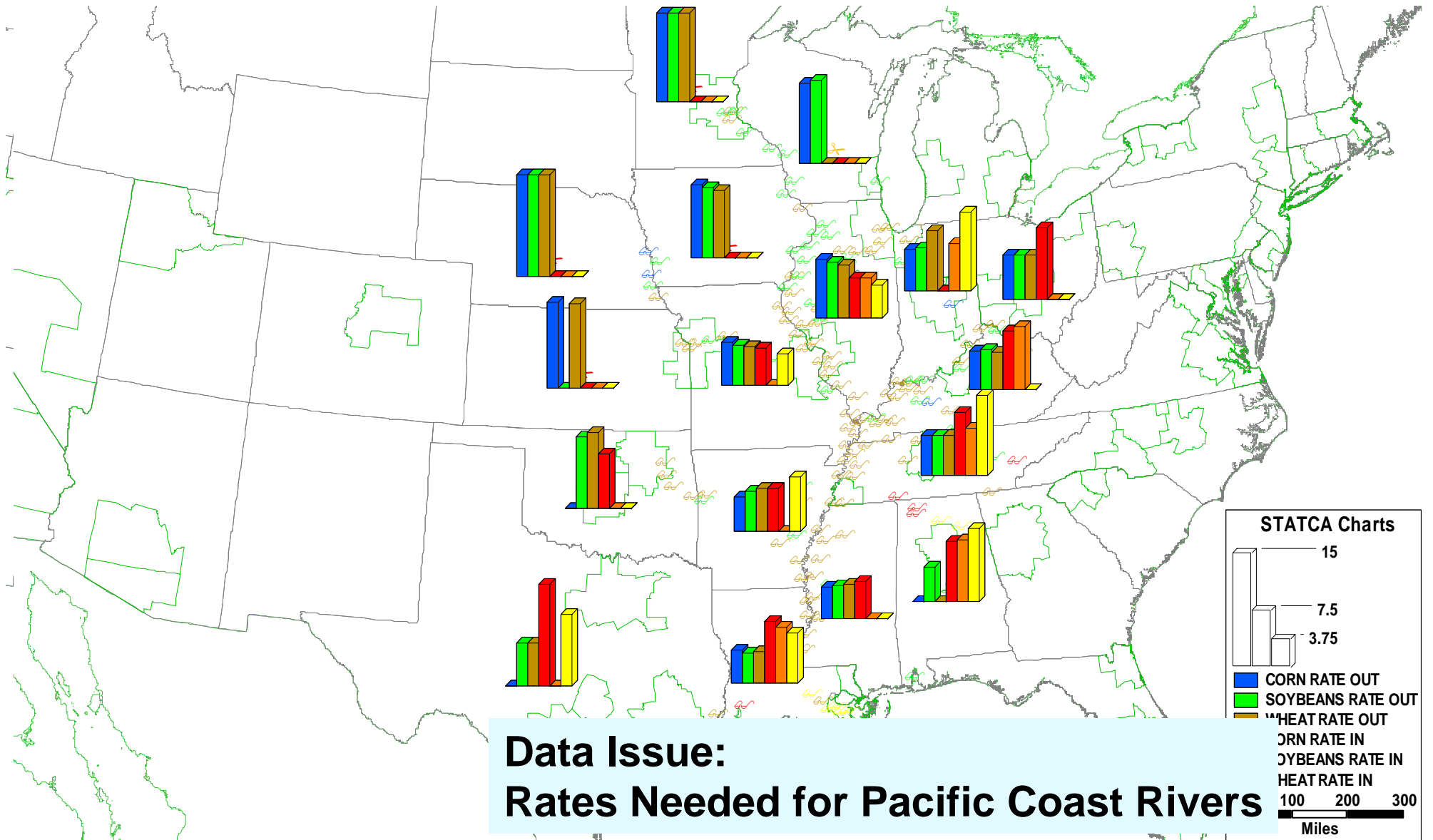
Simulated Wheat Flows, 2002 (Preliminary)



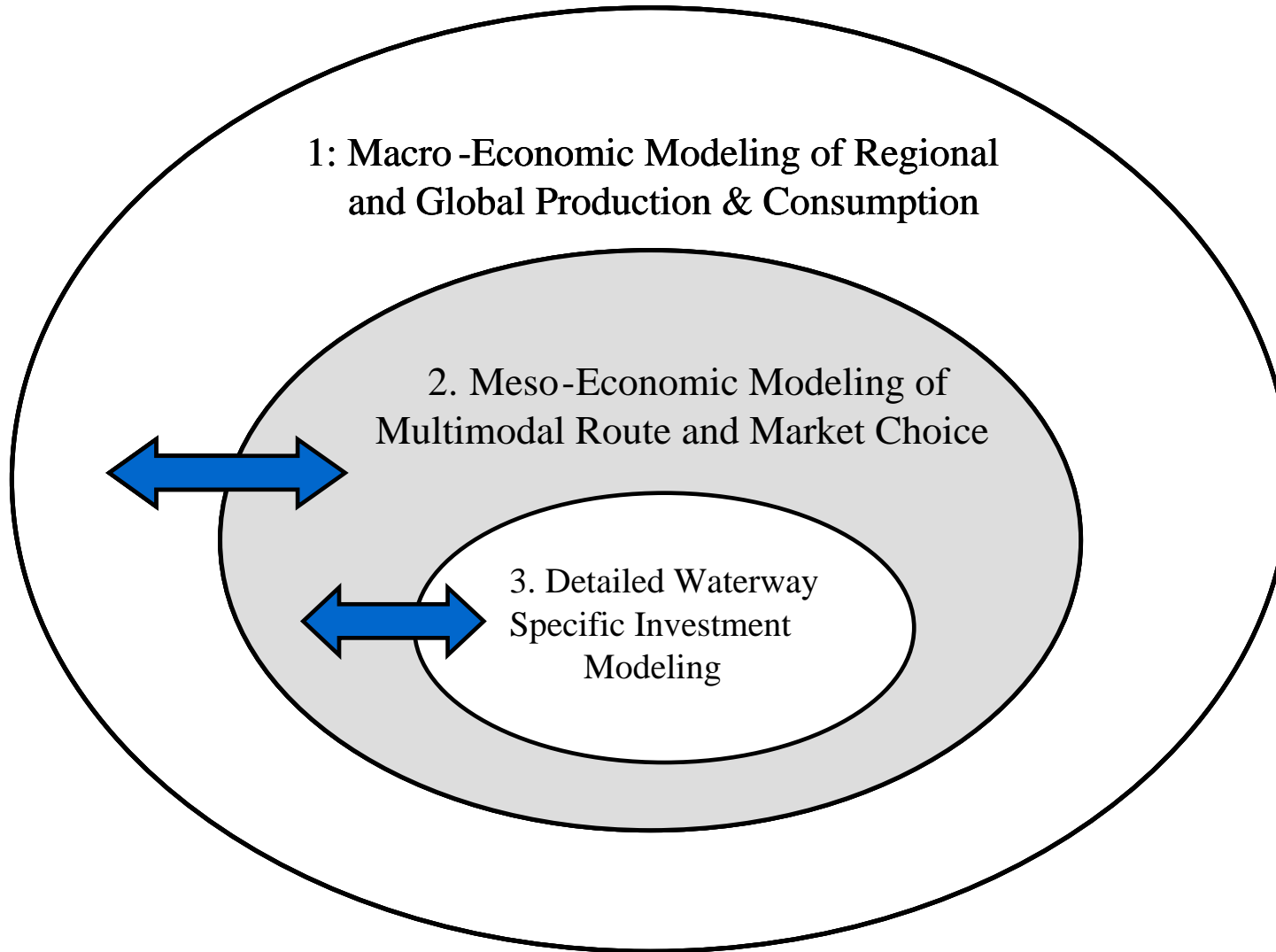
Examples from Locating Waterway Docks along Navigable Rivers



Waterway Rate Mapping Examples



Relationship between Models



= feedback between levels



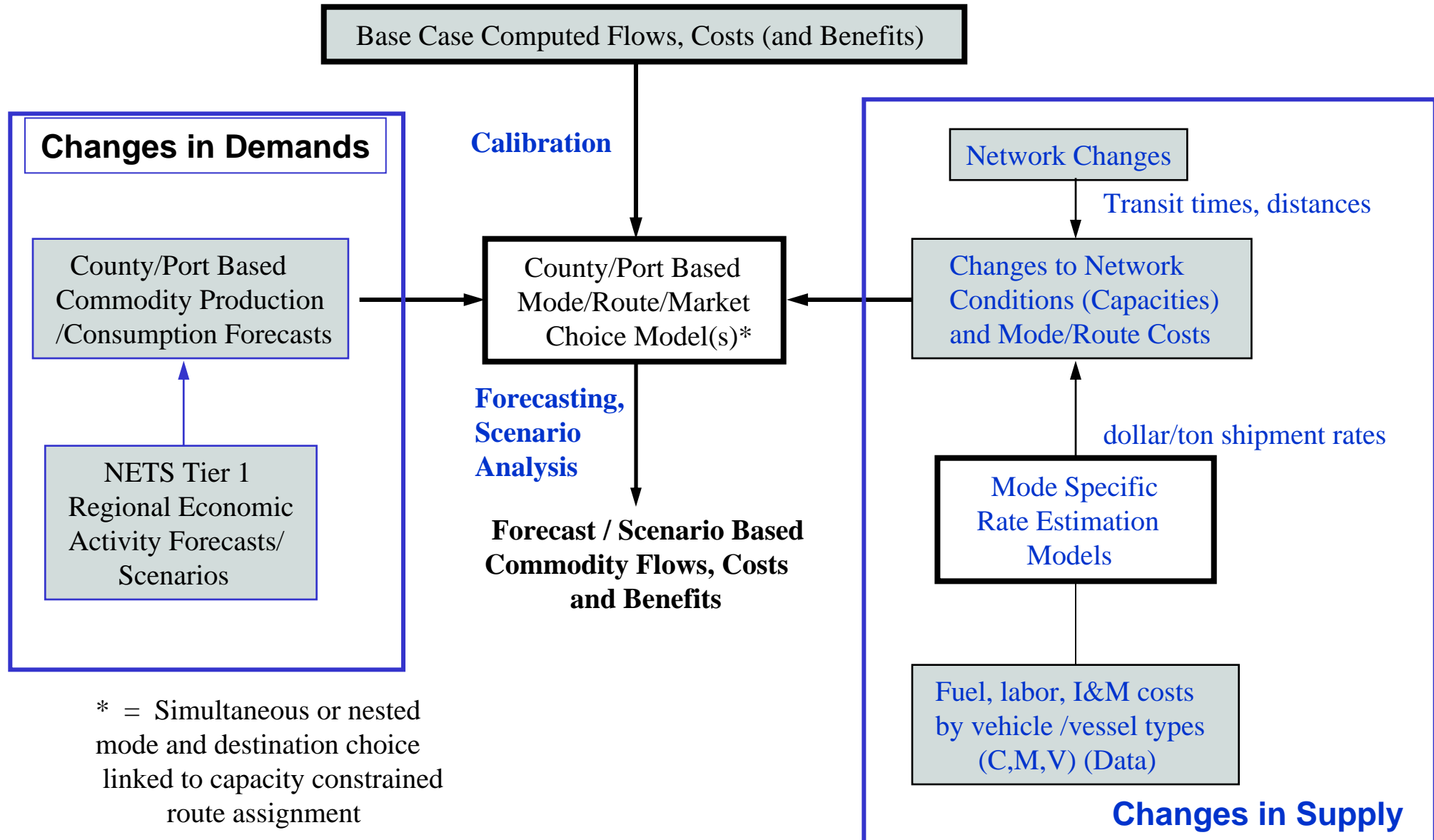
= **level of modeling discussed in this presentation**

RRM Prototype Model (Tinker Toy)

The Prototype Model (“Tinker Toy”) is being developed to:

- Test the theoretical and functional linkages between mode, route and market choice sub-models, solved on a traffic-congested multimodal network
 - Ensure that the modeling approach is supportable with existing datasets
 - Ensure that modeling supports an appropriate range of Corps planning scenarios
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Calibration, Forecasting & Scenario Analysis

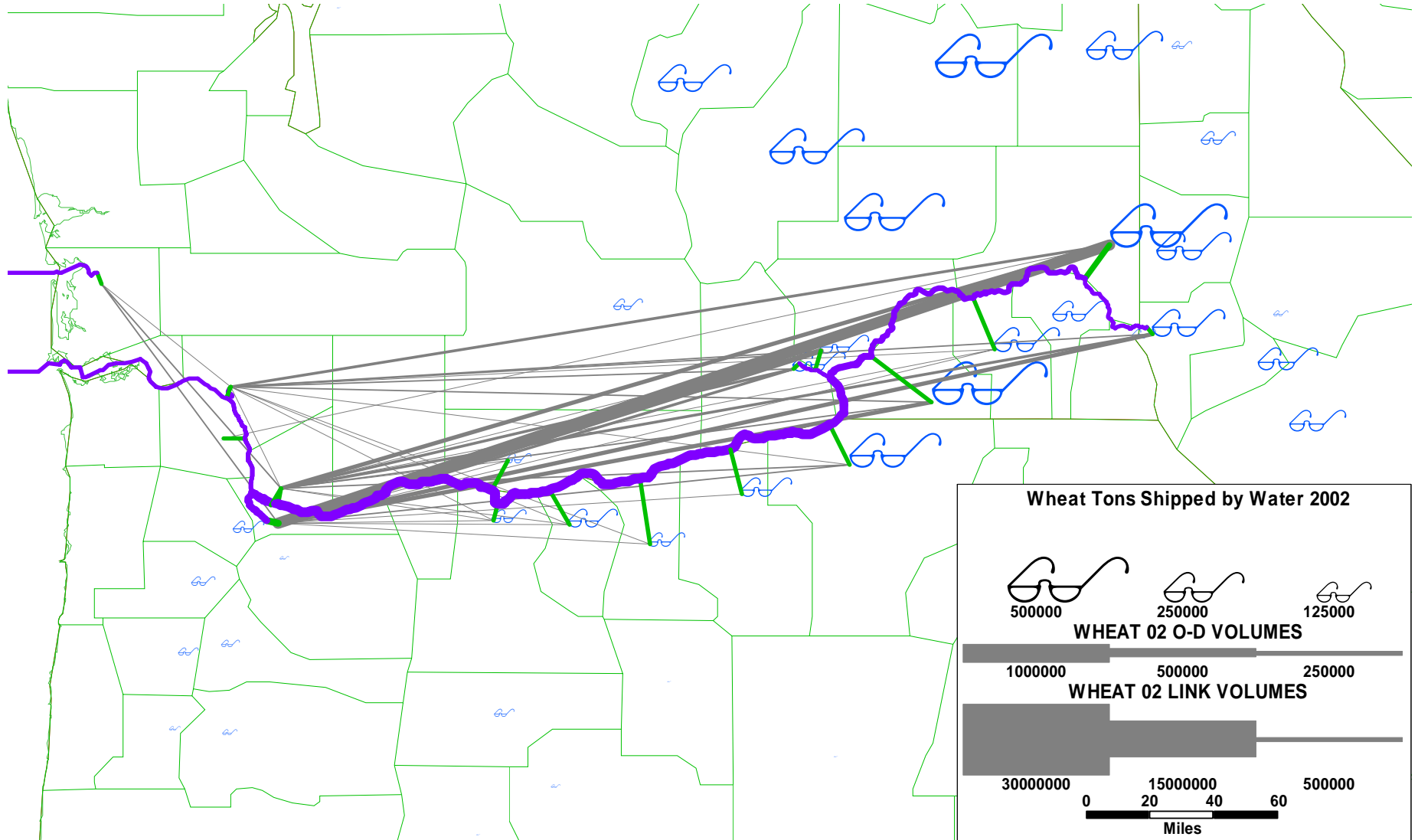


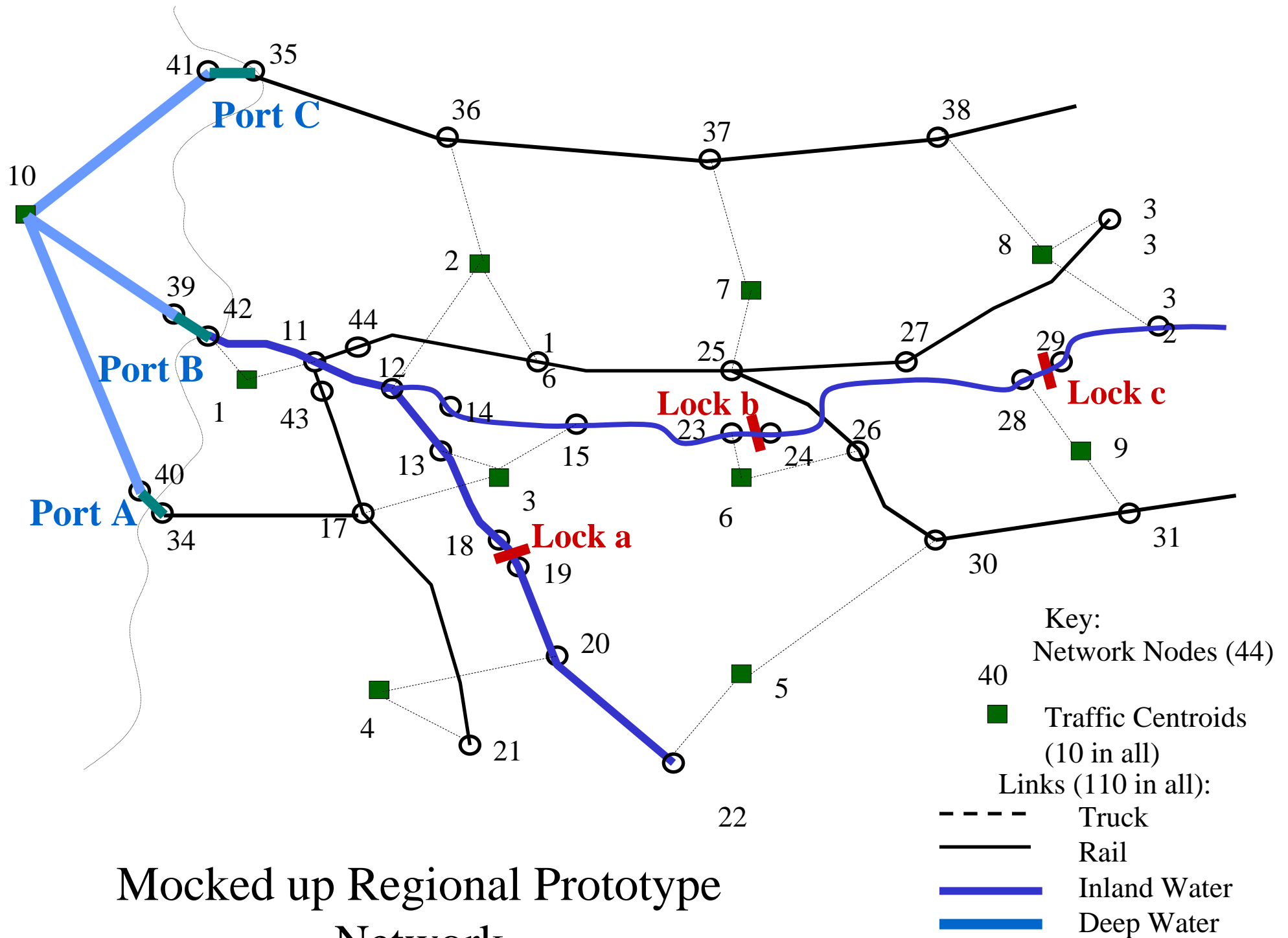
RRM Prototype Model (Tinker Toy)

Scenario

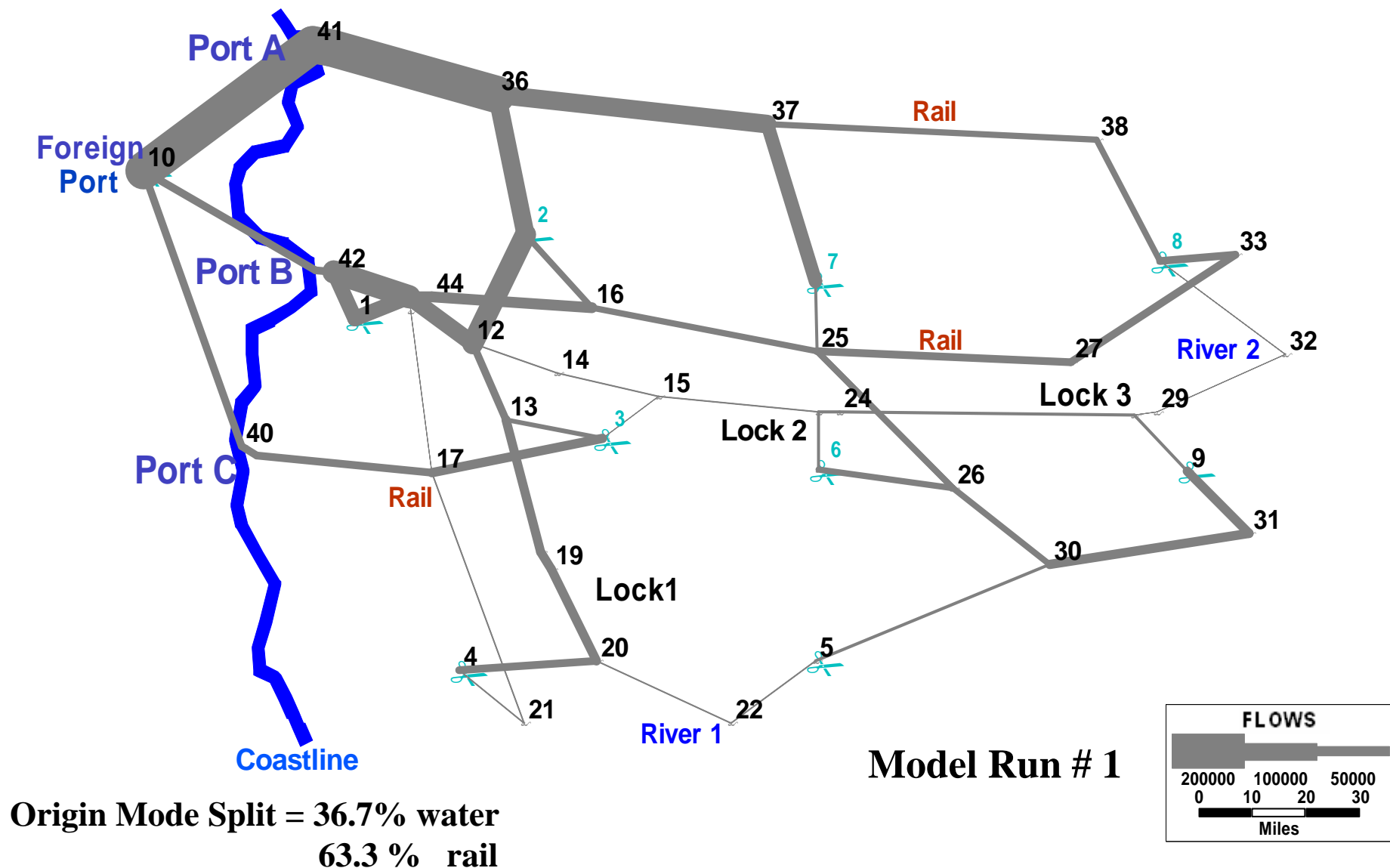
- The Combined Model- Pick best market and best route based on transportation costs and market demand.
 - The base network – developed with Centroids, O-D Flows and network links and nodes
 - Assumption
 - Total Production and Consumption Fixed
 - Changing Impedances
 - Model 1 – Constrained Waterway locks
 - Model 2 – Unconstrained Waterway locks
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Simulated Wheat Flows, 2022 (Preliminary)

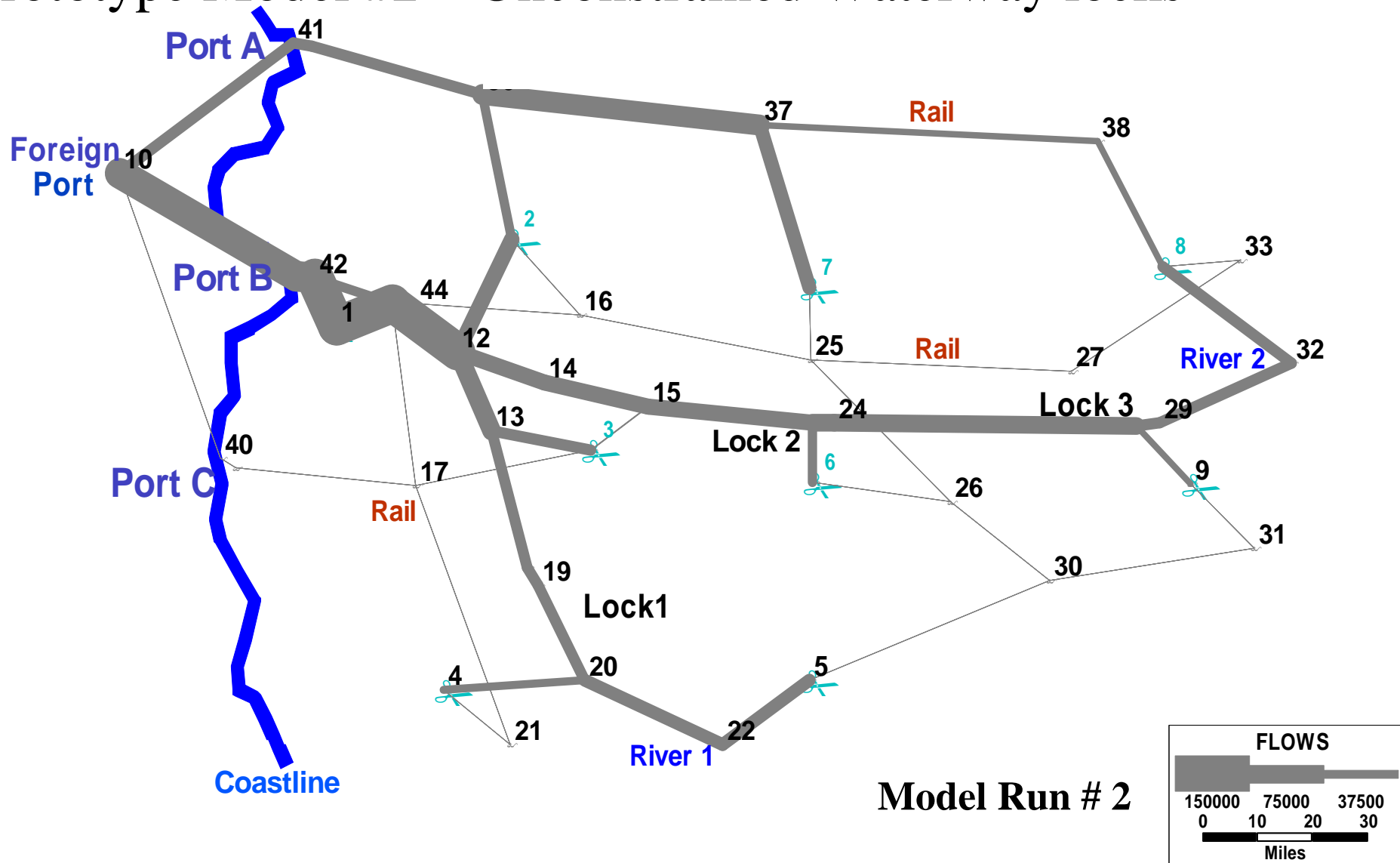




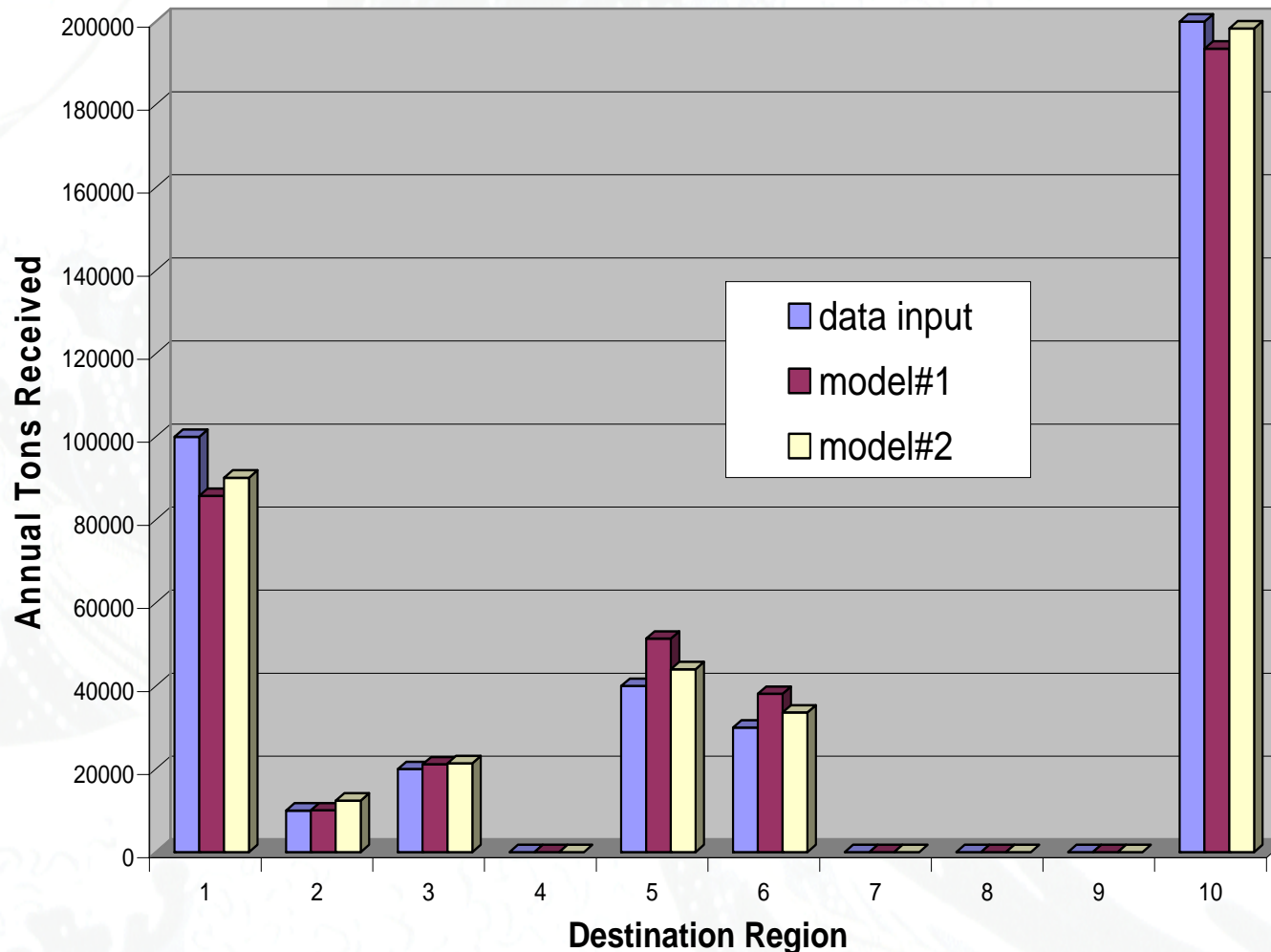
Prototype Model #1 – Constrained Waterway locks



Prototype Model #2 – Unconstrained Waterway locks



Destination Flow Comparisons for Base and Two Model Runs



If routes shift, idea is that you would see a mode shift or destination shift.

Does the model data vary from observed? Does data move in right direction?

Perceived Uses of the RRM

- Datamart of traffic flows and analysis
- Recon or Sketch planning studies for districts
- Scenarios, corridor or policy studies
- Linkages to other agencies and outside groups

Interim Products Now Available

- Commodity specific annual county-to-county flows, assigned to the U.S. inland waterway network
 - Commodity specific annual county-to-county rail flows, assigned to the U.S. rail network
 - Annual county-to-county water and rail grain rates, by commodity (plus preliminary rail rate models)
 - County-based annual commodity production and consumption totals for selected agricultural products (converted to tonnages)
 - An enhanced waterway dock-to-county locational matching file
 - Fortran programs for generating these data for other commodities, by aggregating over dock-to-dock and rail station-to-station flows
 - Fortran programs for creating GIS-compatible files of these various data products (inc. a link volume to O-D flow matching capability)
 - 1997 and updated 2002 link-node versions of the North American Multimodal (truck-rail-water-intermodal)
 - Freight Transportation Network, with Trans-Oceanic Network Links
 - Codes match Corps waterway designations for inland, intra-coastal, and deep sea routes”
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Expected Work for This Year

- *Fully develop “Tinker Toy” in a test scenario*
 - Finalize addition of other commodities into base year
 - Work with other Federal Agencies on acquiring\sharing data and analytical tools
 - Formalize linkages to other NETS models and tools
 - Improve GIS network attributes
 - Formulate update plan for data elements
 - Review I/O modeling as analytical framework for transportation
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Remaining Thoughts

- What is the appropriate level of magnitude and detail for the RRM?
 - How much do we want trucks and truck flows?
 - What about aggregation of rates and costs?
 - Do we focus on data methodologies and partnerships?
 - How much commodity detail is needed?
 - Does the RRM become a national navigation analytical framework?
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